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IS 9953 (1981): Glyceryl Monostearate, Food Grade [FAD 8: Food Additives]

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Indian Standard

SPECIFICATION FOR GLYCERYL MONOSTEARATE, FOOD GRADE

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SPECIFICATION FOR GLYCERYL MONOSTEARATE, FOOD GRADE

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(*Continued on page* 2)

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(*Continued on page* 9)

Indian Standard

SPECIFICATION FOR GLYCERYL MONOSTEARATE, FOOD GRADE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 October 1981, after the draft finalized by the Food Additives Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Use of glyceryl monostearate is permitted as emulsifier for certain food products in the Prevention of Food Adulteration Rules, 1955. It shall preferably be made from edible vegetable oils. It is also made from lard or tallow in other countries.

0.3 This Institution has already issued IS : 4236-1977*.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies requirements and methods of sampling and test for glyceryl monostearate, food grade.

2. TYPES

2.1 The product shall be of the following two types:

a) Self Emulsifying, SE; and
b) Non-Self Emulsifying, NSE.

2.1.1 *Self Emulsifying* — shall contain from 2·5 to 10 percent of emulsifying agent in the form of soluble soap (either sodium or potassium) of stearic acid. Its 3 percent emulsion in water shall have *p*H about 9.

---

*Specification for glyceryl monostearate for cosmetic industry.

†Rules for rounding off numerical values (*revised*).

2.1.2 *Non-Self Emulsifying* — shall not contain soap. Its 3 percent emulsion in water shall have *p*H between 5·8 and 7·0.

3. REQUIREMENTS

3.1 Description — It shall be white to creamish white in colour, in the wax like solid form, powder or granules. It shall have slight characteristic fatty odour and taste and shall be free from rancidity.

3.2 The material shall also conform to the requirements given in Table 1.

TABLE 1 REQUIREMENTS FOR GLYCERYL MONOSTEARATE, FOOD GRADE

Sl No.	Characteristic	Requirement	Method of Test		
			Cl of Appendix A of IS: 4236-1977*	IS : 1699-1974†	Appendix of this Standard
(1)	(2)	(3)	(4)	(5)	(6)
i)	Acid value, *Max*	6·0	A-2	—	—
ii)	Monostearate content, percent by mass, *Min*	40	—	—	A
iii)	Free glycerine, percent by mass, *Max*	10	—	—	A
iv)	Melting point	54 to 60°C	A-4	—	—
v)	Iodine value, *Max*	5·0	A-5	—	—
vi)	Residue on ignition, percent by mass, *Max*:		A-6	—	—
	a) Self emulsifying	1	—	—	—
	b) Non-self emulsifying	0·1	—	—	—
vii)	Iron (as Fe), mg/kg, *Max*	20	A-7	—	—
viii)	Moisture, percent by mass, *Max*	2·0	A-8	—	—
ix)	Saponification value	140-155	Cl 13 of IS : 3508-1966‡	—	—
x)	Lead (as Pb), mg/kg, *ax*	10	—	9	—
xi)	Arsenic (as As), mg/kg, *Max*	3	—	10	—

*Specification for glyceryl monostearate for cosmetic industry.

†Methods of sampling and test for food colours (*first revision*).

‡Method of sampling and test for ghee (butterfat).

4. PACKING, STORAGE AND MARKING

4.1 The material shall be properly packed in polythene lined laminated waterproof gunny bags or laminated woven polythene or polypropylene bags. The containers shall be such as to preclude contamination of the contents with metals or other impurities.

4.2 Storage — The material shall be stored in a cool and dry place.

4.3 Marking — Each container shall be marked legibly and indelibly to give the following information:

a) Name and type of the material, including the words 'Food Grade';
b) Name and address of the manufacturer;
c) Net contents;
d) Monostearate content;
e) Batch or code number;
f) Month and year of manufacture; and
g) Any other marking required under Weights and Measures (Package Commodities) Regulation 1977.

4.3.1 The container may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. SAMPLING

5.1 Representative samples of the material shall be drawn according to the method prescribed in Appendix A of IS : 2557-1963*.

6. TESTS

6.1 Tests shall be carried out by the methods specified in col 4, 5 and 6 of Table 1.

6.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1977†) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

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*Specification for annatto colour for food products.

†Specification for water for general laboratory use (*second revision*).

APPENDIX A

[*Table* 1, *Items* (ii) and (iii)]

DETERMINATION OF MONOSTEARATE AND GLYCERINE

A-0. PRINCIPLE

A-0.1 The method for determination of monostearate and glycerine is based upon their quantitative oxidation with periodic acid (H_5IO_6) according to the following reaction:

$$CH_2OH - CHOH - CH_2OR + H_5IO_6 = CH_2O + CHO - CH_2OR + HIO_3 + 3H_2O$$

$$CH_2OH - CHOH - CH_2OH + H_5IO_6 = CH_2O + CHO - CH_2OH + HIO_3 + 3H_2O$$

A-0.2 Quantitative oxidation is obtained only if excess (20 percent) of periodic acid is used. The amount of glycerine monostearate (GMS) or glycerine is determined by the periodic acid consumed. For determination of GMS, the sample is to be extracted with water or salt solution to remove glycerine. The precision of titration is limited, because the sample titre must be equal to at least 80 percent of the blank titre.

A-0.3 The periodic acid is dissolved in acetic acid of 80 to 95 percent strength. (If sodium metaperiodate is used the acid concentration should be 80 to 85 percent, since at higher concentration of acid some salt precipitates out which may give trouble in taking an exact aliquot of the solution with a pipette).

A-1. APPARATUS

A-1.1 Volumetric Flasks — 100 ml glass stoppered.

A-1.2 Pipette — 25 ml.

A-1.3 Burette — 50 ml.

A-1.4 Graduated Pipette — 5 ml.

A-1.5 Glass Stoppered Flasks — 500 ml.

A-1.6 Rubber Propipetter or Aspirator Bulb

A-1.7 Glass-Stoppered Brown Bottles — For periodic acid solutions.

A-2. REAGENTS

A-2.1 Periodic Acid Stock Solution — Dissolve 12·0 g of periodic acid in water and dilute to 100 ml. Store in a glass stoppered brown bottle. This solution is stable.

A-2.1.1 *Reagent Solution* — Dilute 5·0 to 5·5 ml of stock solution to 100 ml with 95 percent acetic acid. The reagent solution should be prepared fresh.

A-2.3 Starch Indicator Solution — 1 percent.

A-2.4 Chloroform — Laboratory reagent grade.

A-2.5 Acetic Acid — Dilute redistilled glacial acetic acid to 95 percent strength.

A-2.6 Potassium Iodide Solution — 15 percent in water.

A-2.7 Standard Sodium Thiosulphate Solution — 0·1 N.

A-3. PROCEDURE FOR MONOGLYCERIDE

A-3.1 Weigh duplicate 0·7 to 0·8 g sample into 100 ml glass stoppered volumetric flasks accurately and rapidly. Add 50 ml chloroform. Gently swirl to dissolve the sample. If the sample is not soluble (due to the presence of soap) add 5 drops of acetic acid and shake. Add 25 ml distilled water and stopper the flask. Shake vigorously for 1 min to mix the contents thoroughly. Allow to settle for some time If the emulsion does not break, add 3-4 drops of glacial acetic acid, but do not shake. The two layers will separate. When the water layer is perfectly clear, pipette out with an aspirator bulb as much water as possible without sucking the chloroform layer and store it in a 100 ml volumetric flask. Again add 25 ml of water and repeat the procedure 3 times more to extract all the glycerol. Combine all water extracts; make to 100 ml and mix thoroughly. Keep this extract for estimation of glycerol (*see* **A-5**).

A-3.1.1 Add chloroform to the mark, taking off as much of the residual water as possible. Stopper the flask and mix the contents thoroughly. Allow the flasks to stand for 15 min.

A-3.2 Pipette out 25 ml aliquot from chloroform extract into 500-ml glass stoppered flask. Prepare a blank containing 25 ml of chloroform only. Pipette out 25 ml periodic acid reagent solution into each sample and also the blank. Stopper the flasks and mix the contents by gentle swirling. Allow the flasks to stand for 1 to 1·5 h during which the contents of all the flasks should be frequently shaken to mix the sample with the reagent. At the end 1·5 h, add 15 ml of 15 percent potassium iodide solution; wait for 1 min and add 100 ml of water. Shake gently and titrate immediately with 0·1 N sodium thiosulphate solution, using starch solution as indicator.

A-4. CALCULATION

A-4.1 Monoglyceride percent by mass $= \dfrac{(B_1 - S_1) \times N \times M/20 \times 4{\cdot}0}{W}$

where

B_1 = titre of periodic acid reagent in chloroform blank;
S_1 = titre of sample for monoglyceride;
N = Normality of sodium thiosulphate solution;
M = molecular mass of monoglyceride; and
W = mass of sample taken for the test.

A-5. PROCEDURE FOR GLYCERINE

A-5.1 Pipette out 25 ml aliquot from the combined aqueous extract (**A-3.1**). Prepare a blank containing 25 ml distilled water only. Pipette out 25 ml periodic acid reagent solution into each flask. Stopper the flasks and mix the contents by gentle swirling. Allow the flasks to stand for 30 min. At the end of 30 min, add 15 ml of 15 percent potassium iodide solution; wait for 1 min and add 100 ml water, shake gently and titrate immediately with 0·1 N sodium thiosulphate solution using starch solution as indicator.

A-6. CALCULATION

A-6.1 Glycerine, percent by mass $= \dfrac{(B_2 - S_2) \times N \times 2{\cdot}302 \times 4{\cdot}0}{M}$

where

B_2 = titre of periodic acid reagent solution in water blank;
S_2 = titre of sample for monoglyceride;
N = Normality of sodium thiosulphate solution; and
M = Mass of sample taken for the test.

(*Continued from page* 2)

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INDIAN STANDARDS

ON

FOOD ADDITIVES

IS:

1694-1974	Tartrazine, food grade (*first revision*)
1695-1974	Sunset yellow FCF, food grade (*first revision*)
1696-1974	Amaranth, food grade (*first revision*)
1697-1974	Erythrosine, food grade (*first revision*)
1698-1974	Indigo carmine, food grade (*first revision*)
1699-1974	Methods of sampling and test for food colours (*first revision*)
2557-1963	Annatto colour for food products
2558-1974	Ponceau 4R, food grade (*first revision*)
2923-1974	Carmoisine, food grade (*first revision*)
2924-1974	Fast red E, food grade (*fiest revision*)
3827-1966	Riboflavin
3841-1966	β-Carotene
4464-1967	Chlorophyll
4447-1967	Sodium benzoate, food grade
4448-1967	Benzoic acid, food grade
4467 (Part I)-1980	Caramel: Part I Plain (*first revision*)
4467 (Part II)-1980	Caramel: Part II Ammonia process (*first revision*)
4467 (Part III)-1980	Caramel: Part III Ammonia sulphite process (*first revision*)
4750-1968	Sorbitol, food grade
4751-1968	Potassium metabisulphite, food grade
4752-1968	Sodium metabisulphite, food grade
4753-1968	Potassium nitrate, food grade
4818-1968	Sorbic acid, food grade
5055-1969	Lecithin, food grade
5056-1969	Common names for coal tar food colours
5057-1969	Potassium nitrite, food grade
5058-1969	Sodium citrate, food grade
5191-1969	Sodium alginate, food grade
5306-1978	Sodium carboxymethyl cellulose, food grade (*first revision*)
5342-1969	Ascorbic acid, food grade
5343-1969	Butylated hydroxyanisole, food grade
5344-1969	Butylated hydroxytoluene, food grade
5345-1978	Sodium saccharin, food grade (*first revision*)
5346-1975	Coaltar food colour preparations and mixtures (*first revision*)
5707-1970	Agar, food grade
5708-1970	Sodium tartarate, food grade
5709-1978	Calcium saccharin, food grade (*first revision*)
5719-1970	Gelatin, food grade

IS:	
6022-1977	Fast green FCF, food grade (*first revision*)
6029-1977	Green S, food grade (*first revision*)
6030-1971	Sodium propionate, food grade
6031-1971	Calcium propionate, food grade
6120-1971	Method of test for total dye content in food colour preparations
6385-1978	Saccharin, food grade (*first revision*)
6405-1971	Canthaxanthine, food grade
6406-1977	Brilliant blue, FCF, food grade (*first resision*)
6793-1972	Fumaric acid, food grade
6794-1972	Dodecyl gallate, food grade
6795-1972	Acacia (arabic) gum, food grade
6796-1972	Propyl gallate, food grade
6797-1972	Methyl ester of beta-apo-8-carotenoic acid
6798-1972	Octyl gallate, food grade
7237-1974	Carob bean gum, food grade
7238-1974	Tragacanth gum, food grade
7239-1974	Gum *ghatti* food grade
7260-1974	Ethyl ester of beta-apo-8-carotenoic acid, food grade
7584-1975	Reference food colour boxes
7905-1975	Calcium alginate, food grade
7908-1975	Sulphur dioxide, food grade
7928-1975	Alginic acid, food grade
8356-1977	Titanium dioxide, food grade
9504-1980	Tartaric acid, food grade
9505-1980	Monosodium Le — Glutamate food grade
9506-1980	Amylase, *aspergillus oryzae*, food grade

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbo*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous Intensity	candela	cd
Amount of substance	mole	mole

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

AMENDMENT NO. 1 MARCH 2006
TO
IS 9953 : 1981 SPECIFICATION FOR GLYCERYL MONOSTEARATE, FOOD GRADE

(*Page* 3, *Foreword*, *clause* **0.3**) — Substitute 'The Bureau has already issued IS 4236 : 1999*.' *for* 'This Institution has already issued IS : 4236 -1977*.'

(*Page* 3, *footnote marked* *) — Substitute the following for the existing:

'* Specification for glyceryl monostearate for cosmetic industry (*third revision*).'

(*Page* 4, *Table* 1) — Substitute the following for the existing table:

Table 1 Requirements for Glyceryl Monostearate, Food Grade
(*Clause* 3.2)

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Appendix of This Standard	Other Indian Standards
(1)	(2)	(3)	(4)	(5)
i)	Acid value, *Max*	6.0	—	A-2 of IS 4236 : 1999*
ii)	Monostearate content, percent by mass, *Min*	40	A	—
iii)	Free glycerine, percent by mass, *Max*	10	A	—
iv)	Melting point	54° to 60°C	—	A-4 of IS 4236 : 1999*
v)	Iodine value, *Max*	5.0	—	A-5 of IS 4236 : 1999*
vi)	Residue on ignition, percent by mass, *Max*:		—	A-6 of IS 4236 : 1999*
	a) Self emulsifying	1	—	—
	b) Non-self emulsifying	0.1	—	—
vii)	Iron (as Fe), mg/kg, *Max*	20	—	A-7 of IS 4236 : 1999*
viii)	Moisture, percent by mass, *Max*	2.0	—	A-8 of IS 4236 : 1999*
ix)	Saponification value	140 - 155	—	13 of IS 3508 : 1966†
x)	Heavy metals, mg/kg, *Max*	10	—	5 of IS 1699 : 1995‡
xi)	Arsenic (as As), mg/kg, *Max*	3	—	15 of IS 1699 : 1995‡

*Specification for glyceryl monostearate for cosmetic industry (*third revision*).

†Methods of sampling and test for ghee (butterfat).

‡Methods of sampling and test for food colours (*second revision*).

(*Page* 5, *clause* **4.3.1**) — Substitute the following for the existing clause:

'**4.3.1** *BIS Certification Marking*

The product may also be marked with the Standard Mark.

4.3.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.'

(*Page* 5, *clause* **5.1**, *line* 2) — Substitute '4 of IS 1699 : 1995*' *for* 'Appendix A of IS : 2557 - 1963*'.

(*Page* 5, *clause* **6.2**, *line* 2) — Substitute 'IS 1070 : 1992†' *for* 'IS : 1070 - 1977†'.

(*Page* 5, *footnotes*) — Substitute the following for the existing:

*Methods of sampling and test for food colours (*second revision*).
†Reagent grade water (*third revision*).

(FAD 8)

Reprography Unit, BIS, New Delhi, India